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10/775,851

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Robert L. Ponziani

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02/13/2006

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EXAMINER

DEB, ANJAN K

ART UNIT

PAPER NUMBER

2858

DATE MAILED: 02/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------|-----------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/775,851 | PONZIANI ET AL. | |
| | Examiner | Art Unit | |
| | Anjan K. Deb | 2858 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7,9-14 and 16-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>02/10/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: Serial Numbers of related applications are missing (see para [0001]).

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fong (US 6,396,277 B1) in view of Dauvergne (US 3,774,390 A).

Re claim 1, Fong discloses apparatus for sensing spark in an igniter comprising holder 10 into which the igniter is inserted, a coil 4 mounted in the holder 10, and detector 100 for detecting current in the coil (Fig. 1).

Fong did not expressly disclose igniter in gas turbine engine.

Dauvergne discloses igniter (spark plug) in gas turbine engine.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Fong by adding igniter (spark plug) in gas turbine disclosed by Dauvergne as required for ignition in gas turbine engine.

Re claim 3, Fong discloses sensor in thermal contact with igniter (spark plug) (Fig. 1).

Re claim 4, Fong discloses holder 10 is conductive and held at system ground. Holder 10 being a cylinder made of metal is broadly interpreted as being conductive and connected to ground (engine body).

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fong (US 6,396,277 B1) and Dauvergne (US 3,774,390 A) in view of Warner (US 4,090,125).

Re claim 7, Fong modified by Dauvergne disclosed all of the claimed limitations as set forth above except part of igniter forms a core of the coil.

Warner discloses inductive pickup coil wherein igniter forms a core (transformer) of the coil (column 3 lines 52-58).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Fong as modified by Dauvergne by adding igniter core to form a core of the induction pick up coil disclosed by Warner for improved magnetic coupling between sensor coil and the igniter for accurately sensing igniter current.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fong (US 6,396,277 B1) and Dauvergne (US 3,774,390 A) in view of DeFreitas (US 5,499,497).

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Re claim 2, Fong as modified by Dauvergne disclosed all of the claimed limitations as set forth above except holder reaches a temperature of 175° F or greater during normal operation of the engine.

DeFreitas discloses temperature detector for an igniter (plug) wherein igniter surface reaches a temperature of 175° F or greater during normal operation of the engine (Fig. 5).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combination system of Fong and Dauvergne by adding holder for igniter capable of withstanding 175° F or greater since DeFreitas teaches that igniter reaches a temperature of 175° F or greater temperature during normal operation of the engine.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fong (US 6,396,277 B1), Dauvergne (US 3,774,390 A) and DeFreitas (US 5,499,497).
in view Owens (US 5,508,618).

Re claim 5 Fong as modified by Dauvergne and DeFreitas disclosed all of the claimed limitations as set forth above except no electrical current passing through the igniter enters the coil.

Owens discloses sensor (detector 10) comprises an inductive pick-up (30) (column 4 lines 8-11) wherein no electrical current passing through the igniter enters the coil (inductive pick-up).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combination system of Fong, Dauvergne and DeFreitas by adding inductive (coil)

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pickup sensor disclosed by Owens for measuring igniter current inductively for protection of sensor from high ignition currents.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Angell (US 4,938,019) in view of Owens (US 5,508,618).

Re claim 9, Angell discloses apparatus for attaching gas turbine engine comprising a base 130 containing a threaded bore, into which bore the igniter 120 can be threaded, and holes 131 in the base through which fasteners can fasten the base to the engine (Fig. 2)(column 4 lines 54-65).

Angell did not expressly disclose coil affixed to the base, for detecting currents in the igniter.

Owens discloses apparatus (detector 10) for gas turbine engine comprising coil (wire) 30 wherein current is induced for measuring igniter current at the igniter itself (column 3 lines 46-63).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Angell by adding inductive coil (wire) disclosed by Owens for measuring igniter current at the igniter itself.

8. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angell (US 4,938,019) in view of Owens (US 5,508,618) and further in view of Skerritt (US 4,636,777).

Re claims 10 and 11, Angell discloses apparatus 10 for attachment to an igniter 120 for a gas turbine engine, the igniter 120 having a proximal end 122, a casing (12,16, 144) at the

proximal end, and an electrical connector (connected)(column 4 line 68) at the proximal end 122, so that the housing fits about the proximal end (column 4 line 47 to column 5 line 8)(Fig. 2). Electrical connector is inherently disclosed as required to connect high-energy DC voltage supply to electrode 140 of igniter.

Angell did not expressly disclose casing having a cross sectional shape S. [MPEP 2144.04. B. Changes in Shape. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) (The court held that the configuration of the claimed disposable plastic nursing container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.)].

Angell did not expressly disclose an inductive pick-up, and an amplifier that amplifies signals produced by the pick-up within the housing.

Owens discloses apparatus (detector 10) for gas turbine engine comprising inductive pick up (wire) 30 wherein current is induced for measuring igniter current at the igniter itself in thermal contact with casing (column 3 lines 46-63). Having an inductive pick up (wire) device at the igniter itself as disclosed by Owens is broadly interpreted as inductive pick up device is in thermal contact with the casing.

Skerritt (US 4,636,777) discloses monitoring arrangement for a gas turbine spark ignition system comprising igniter 13 and amplifier 33 (Fig. 1).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Angell by adding a casing having a cross sectional shape S as suited for spark ignition and by adding inductive pick-up coil (wire) disclosed by Owens placed in thermal contact with

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the housing for picking-up ignition current signal inductively and by adding an amplifier disclosed by Skerritt for amplification of output signal.

9. Claim 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angell (US 4,938,019) and Owens (US 5,508,618) in view of Skerritt (US 4,636,777) and further in view of Maris (US 4,906,950).

Re claim 12, the combination system of Angell, Owens and Skerritt disclosed all of the claimed limitations except wherein amplifier comprises RLC amplifying circuit.

Maris (US 4,906,950) discloses amplifier comprising RLC resonant circuit for correcting output signal amplitude due to impedance drift caused by temperature changes (column 2 lines 18-41, column 6 lines 43-55).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combination system of Angell, Owens and Skerritt by adding amplifier comprising RLC circuit disclosed by Maris for correcting output signal amplitude due to impedance drift caused by temperature changes.

Re claims 13-14, Maris disclosed RLC resonant circuit and as such is resonant to sinusoidal resonant frequency of $1/T$ (where, T = period = $2D$). Re claim 14, Maris did not expressly disclose triangular voltage pulses but would have been obvious to use pulses of triangular shape as an alternative to rectangular pulses or other type of pulses producing an alternating current.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combination system of Angell, Owens and Skerritt by adding amplifier comprising RLC circuit resonant to sinusoidal resonant frequency of $1/T$ (where, T = period = $2D$) disclosed by Maris and by using pulses of triangular shape as an alternative to rectangular pulses or other type of pulses for producing an alternating current.

10. Claims 16, 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Owens (US 5,508,618) in view of Skerritt (US 4,636,777).

Re claim 16, 17, and 20 Owens discloses apparatus comprising an igniter for a gas turbine engine (abstract), an inductive pick-up 30 adjacent the igniter for picking up signals produced by sparks (column 3 lines 64-67, column 4 lines 17-21) (Fig. 1).

Owens did not expressly disclose amplifier having no active elements, which amplifies signals produced by the pick-up.

Skerritt (US 4,636,777) discloses monitoring arrangement for a gas turbine spark ignition system comprising igniter 13 comprising amplifier 33 (Fig. 1). Skerritt did not expressly disclose that the amplifier has no active components.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Owens by adding an amplifier disclosed by Skerritt for amplification of output signal. Furthermore, it would have been obvious to include an amplifier having no active components so as to minimize interference.

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11. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Owens (US 5,508,618) and Skerritt (US 4,636,777) in view of Maris (US 4,906,950).

Re claims 18 and 19 Owens as modified by Skerritt disclosed all of the claimed limitations as set forth above except amplifier comprises RLC resonant circuit.

Maris (US 4,906,950) discloses amplifier comprising RLC resonant circuit for correcting output signal amplitude due to impedance drift caused by temperature changes (column 2 lines 18-41, column 6 lines 43-55).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combination system of Owens and Skerritt by adding amplifier comprising RLC resonant circuit disclosed by Maris for correcting output signal amplitude due to impedance drift caused by temperature changes.

Allowable Subject Matter

12. Claims 6, 8 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Allowable Subject Matter

13. The following is a statement of reasons for the indication of allowable subject matter:

Claims 6 and 8 are allowable because the prior art does not teach or fairly suggest an external conductive shield surrounds the cable and is connected to the engine and the

cable connects to the igniter at a contact point, and a second conductive shield extends from the contact point along the igniter, and wherein the coil is wholly external to both conductive shields.

Claim 15 is allowable because the prior art does not teach or fairly suggest ring of high permeability material which surrounds the igniter when the housing is fitted to the igniter, and a magnetic field produced by current passing through the connector travels through both the high permeability material and the inductive pick-up.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wixon (US 4,783,991) discloses ignition spark monitor by capacitive sensor (Fig. 4) comprising cable 41 with shield to eliminate radio interference problems.

Kravis (US 6,426,626 B1) discloses (Fig. 1) sensing spark in an igniter (spark plug) comprising an inductive pick-up coil 16 connected to capture circuit 56 (Fig. 2) for detecting sparking wherein part of the igniter (spark plug) forms a core for the coil 16.

Bonavia (US 5,510,952) discloses ignition system for gas turbine engine comprising rectangular pulses (Fig. 3B)

McQueeney (US 6,850,070 B2) discloses coil on plug inductive sampling method.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is 571-272-2228. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached at 571-272-2399.



Anjan K. Deb, PhD, PE (Electrical)

Primary Patent Examiner

Art Unit: 2858

2/7/06

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